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EXAMINER

DOUGLAS, JOHN CHRISTOPHER

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 08/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/621,197

Applicant(s)

OWEN, HARTLEY

Examiner

John C. Douglas

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 14-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☒ Claim(s) 1-17 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Examiner acknowledges the response filed on 6/16/2006.
2. A new rejection follows:

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-3, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ross (US 4946656).

6. With respect to claim 1, Ross discloses a fluid catalytic cracking process comprising:

(a) cracking a hydrocarbon feed by contact with regenerated fluidized cracking catalyst in a riser reactor to produce a mixture of cracked hydrocarbons and spent

Art Unit: 1764

catalyst containing coke and strippable hydrocarbons and discharging the mixture directly into a closed cyclonic separation means within a vessel (see Ross, column 4, lines 19-43 and column 6, lines 15-25 and Figure 1);

(b) cyclonically separating the mixture into a cracked hydrocarbon product with reduced catalyst content and a spent catalyst containing coke and strippable hydrocarbons (see Ross, column 4, lines 35-49 and column 6, lines 15-25 and Figure 1);

(c) discharging the spent catalyst down from the cyclonic separation into a catalyst stripper within the vessel with the stripper in open fluid communication with the vessel and with at least a majority of the stripper cross sectional area is open to the vessel (see Ross, column 5, lines 43-55 and column 6, lines 9-15 and Figure 1);

(d) stripping the spent catalyst by maintaining the spent catalyst as a dense phase fluidized bed fluidized by stripping steam into the lower portion of the bed to produce stripped hydrocarbons, which is discharged into the vessel and stripped catalyst which is discharged into a catalyst regenerator (see Ross, column 6, lines 9-45 and Figure 1);

(e) regenerating stripped catalyst in the regenerator at catalyst regeneration conditions to produce regenerated catalyst which is recycled to the cracking reactor (see Ross, column 1, lines 43-46 and column 4, lines 7-10 and it is inherent for catalyst regeneration to include contacting the stripped catalyst with an oxygen containing gas to burn the coke from the catalyst, see Chitnis (US 5681450), column 3, lines 63-67); and

Art Unit: 1764

(f) recovering the stripper vapor from the fluidized bed into a vertical conduit with an inlet above the fluidized bed and an outlet connected to the cyclonic separation means (see Ross, column 6, lines 30-42 and Figure 1).

Ross does not disclose where the stripper is in open fluid communication with the vessel and at least a majority of the stripper cross sectional area is open to the vessel. Instead, Ross discloses a stripper cap, which prevents the stripper from being in open fluid communication with the vessel (see Ross, column 6, lines 30-39 and Figure 1).

However, the omission of an element and its function is not obvious if the function of the element is not desired (see § MPEP 2144.04 II. A. citing *Ex Parte Wu*, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989).

In the instant case, the applicant omits the presence of a stripper cap because such a cap is not required to isolate the stripper (see Applicant's remarks, page 3). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Ross to exclude the presence of a stripper cap because it is not required.

7. With respect to claim 2, Ross discloses a primary cyclone attached to the riser by a conduit and cracked products and spent catalyst from the riser are sent to the primary cyclone via the conduit and the primary cyclone discharges spent catalyst down a dipleg and discharges vapor into a second cyclone which discharges spent catalyst down a second dipleg and vapor is discharged to downstream distillation (see Ross, column 4, lines 50-68) and a vertical conduit transfers stripper vapor from the stripper to the outlet of the primary cyclone (see Ross, column 6, lines 30-42).

Art Unit: 1764

8. With respect to claim 3, Ross discloses where the cracked hydrocarbons pass from the primary cyclone to the secondary cyclone without being added to the reactor vessel atmosphere and where the vertical conduit is attached to the inlet of the secondary cyclone and does not permit stripped hydrocarbons from entering the vessel atmosphere (see Ross, column 4, lines 65-68 and column 6, lines 30-42).

9. With respect to claim 9, Ross discloses where stripper vapor is discharged from the fluidized bed into the cyclone system through an inlet to the secondary cyclone (see Ross, column 6, lines 23-42 and Figure 1, where the vertical conduit outlet connects to the inlet of the second cyclone).

10. With respect to claim 7, Ross discloses where the outlet of the vertically extending transfer conduit is connected to an inlet of the secondary cyclone (see Ross, column 5, lines 1-6 and Figure 1, where the vertical conduit outlet connects to the inlet of the second cyclone).

11. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ross in view of Chitnis (US 5681450). Ross discloses everything in claim 2, but does not disclose where at least a portion of the vertically extending transfer conduit is within the primary dipleg.

However, Chitnis discloses a cyclone with a gas reflux means comprising a tube having an inlet at the bottom of a cyclone and an exit inside of the cyclone and the tube has a diameter smaller than the diameter of the cyclone (see Chitnis, column 13, lines 17-24 and Figure 4).

Chitnis discloses that reintroducing reflux gas into the cyclone by a separate gas entry means improves cyclone efficiency (see Chitnis, column 12, lines 28-35).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Ross to include a cyclone with a gas reflux means comprising a tube having an inlet at the bottom of a cyclone and an exit inside of the cyclone and the tube has a diameter smaller than the diameter of the cyclone in order to improve cyclone efficiency.

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ross. Ross teaches everything in claim 2, but does not explicitly disclose where the outlet of the vertically extending transfer conduit is connected to an inlet of the primary separator. However, according to *In re Burhans*, 154 F.2d 690 (CCPA 1946), a selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results (see MPEP 2144.04 IV-C). In the instant case, the difference between claim 6 and the invention of Ross is the order of feeding the stripping vapor because claim 6 feeds the stripping vapor to the primary cyclone and Ross feeds the stripping vapor to the secondary cyclone. In addition, it would be expected by one having ordinary skill in the art to feed stripping vapor to the primary cyclone instead of the secondary cyclone so that the stripping vapor could be subjected to further separation. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Ross to change the order of adding stripping vapor in order to achieve the expected result of further separation.

Art Unit: 1764

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ross in view of Lomas (US 5584985). Ross discloses everything in claim 1, but does not disclose where a purge gas stream is added at an elevation above the cyclone separation means in an amount equal to 0.5 to 10 mole % of the stripper vapor.

However, Lomas discloses passing a purge medium at the top of the separation vessel (see Lomas, column 3, lines 32-40 and column 7, lines 35-38 and Figure).

Lomas teaches that the purge medium is used to maintain a low hydrocarbon partial pressure to prevent the problem of coking (see Lomas, column 7, lines 25-34).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Ross to include passing a purge medium at the top of the separation vessel in order to maintain a low hydrocarbon partial pressure to prevent the problem of coking. Also, it would have been obvious to send purge material in an amount equal to 0.5 to 10 mole % of the stripper vapor because the amount of purge added is the amount that is used to maintain a low hydrocarbon partial pressure to prevent the problem of coking.

14. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ross in view of Chitnis. Ross discloses (a) cracking a hydrocarbon feed by contact with regenerated fluidized cracking catalyst in a riser reactor to produce a mixture of cracked hydrocarbons and spent catalyst containing coke and strippable hydrocarbons and having a temperature of at least 980 degrees F and discharging the mixture directly into a closed cyclonic separation means comprising primary and secondary cyclone

Art Unit: 1764

separators within a vessel (see Ross, column 4, lines 19-43 and column 6, lines 15-25 and Figure 1 and MPEP 2144.05);

(b) cyclonically separating the mixture in a primary cyclone attached to the riser by a conduit and cracked products and spent catalyst from the riser are sent to the primary cyclone via the conduit and the primary cyclone discharges spent catalyst down a dipleg and discharges vapor into a second cyclone (see Ross, column 4, lines 35-49 and column 6, lines 15-25 and Figure 1). Ross does not disclose the exact amounts of separation (MPEP 2144.05 II-A, which states, "generally, differences in concentration or temperature will not support the patentability of subject matter encompassed in the prior art unless there is evidence indicating such concentration or temperature is critical);

(c) cyclonically separating the mixture in the secondary cyclone which discharges spent catalyst down a second dipleg and vapor is discharged to downstream distillation (see Ross, column 4, lines 50-68). Ross does not disclose the exact amounts of separation (MPEP 2144.05 II-A, which states, "generally, differences in concentration or temperature will not support the patentability of subject matter encompassed in the prior art unless there is evidence indicating such concentration or temperature is critical);

(d) stripping the spent catalyst by maintaining the spent catalyst as a dense phase fluidized bed fluidized by stripping steam into the lower portion of the bed to produce stripped hydrocarbons, which is discharged into the vessel and stripped catalyst which is discharged into a catalyst regenerator (see Ross, column 6, lines 9-45 and Figure 1);

(e) regenerating stripped catalyst in the regenerator at catalyst regeneration conditions to produce regenerated catalyst which is recycled to the cracking reactor (see Ross, column 1, lines 43-46 and column 4, lines 7-10 and it is inherent for catalyst regeneration to include contacting the stripped catalyst with an oxygen containing gas to burn the coke from the catalyst, see Chitnis (US 5681450), column 3, lines 63-67); and

(f) recovering the stripper vapor from the fluidized bed into a vertical conduit fluidly isolated from the separation vessel with an inlet above the fluidized bed and an outlet connected to the cyclonic separation means (see Ross, column 6, lines 30-42 and Figure 1).

Ross does not disclose where the vertical conduit is physically attached to or within at least one of the primary cyclone diplegs.

However, Chitnis discloses a cyclone with a gas reflux means comprising a tube having an inlet at the bottom of a cyclone and an exit inside of the cyclone and the tube has a diameter smaller than the diameter of the cyclone (see Chitnis, column 13, lines 17-24 and Figure 4).

Chitnis discloses that reintroducing reflux gas into the cyclone by a separate gas entry means improves cyclone efficiency (see Chitnis, column 12, lines 28-35).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Ross to include a cyclone with a gas reflux means comprising a tube having an inlet at the bottom of a cyclone and an exit inside of the cyclone and the tube has a diameter smaller than the diameter of the cyclone in order to improve cyclone efficiency.

Art Unit: 1764

15. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ross in view of Chitnis. Ross in view of Chitnis discloses everything in claim 10, but Ross does not disclose where the vertical transfer conduit is partially inside the primary cyclone dipleg.

However, Chitnis discloses a cyclone with a gas reflux means comprising a tube having an inlet at the bottom of a cyclone and an exit inside of the cyclone and the tube has a diameter smaller than the diameter of the cyclone (see Chitnis, column 13, lines 17-24 and Figure 4).

Chitnis discloses that reintroducing reflux gas into the cyclone by a separate gas entry means improves cyclone efficiency (see Chitnis, column 12, lines 28-35).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Ross to include a cyclone with a gas reflux means comprising a tube having an inlet at the bottom of a cyclone and an exit inside of the cyclone and the tube has a diameter smaller than the diameter of the cyclone in order to improve cyclone efficiency.

16. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ross in view of Chitnis. Ross in view of Chitnis discloses everything in claim 10 (see paragraph 14), and Ross discloses a stripper cap that extends to the vessel sidewalls (see Ross, column 5, lines 55-57 and Figure 1).

Allowable Subject Matter

17. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach nor disclose a cyclone dipleg containing a vertical cylinder having a longitudinal axis that is inside and axially aligned with the cyclone dipleg.

Response to Arguments

19. Applicant's arguments, see response, filed on 6/16/2006, with respect to claim 1 have been fully considered and are persuasive. The 102(b) rejection of claims 1-3, 7, and 9 has been withdrawn.

20. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Chitnis reference is used to provide for the teaching of a snorkel function and the Lomas reference is used to provide for a teaching of a purge medium.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCD

8/25/2006


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